Kickapoo Tribe in Kansas

Air Quality Complaint History

An analysis written as a
support document to meet grant deliverables for the
Kickapoo Tribe in Kansas Air Quality Program
funded under the Clean Air Act Section 103

Grant No: TX-97728701-0

Project Period: Oct. 1st 2011 – Sep. 30th 2012
Drafted by: Mike Kelley, Brownfields Coordinator
Prepared by: Scott Weir, Air Quality Coordinator
Kickapoo Environmental Office
1107 Goldfinch Road
Horton, Kansas 66439

Air Quality Complaint History

Background

The Kickapoo Tribe in Kansas (KTIK), located in Brown County, is a federally recognized Indian Tribe with approximately 1,600 tribal members. The Kickapoo Reservation is west of Horton, Kansas covering approximately thirty (30) square miles with a land base consisting of tribal trust land, tribal fee land, and non-Indian owned land. The Kickapoo Tribal Council is the official governing body, which operates in accordance with the Kickapoo Constitution and By-Laws established by the Indian Reorganization Act of June 18, 1934, amended June 15, 1935.

Under the Section 103 work plan for Federal Fiscal Year 2012, the Kickapoo Environmental Office conducted an Air Quality Survey of the local population, specifically Tribal members living on the reservation. Based on the results of the Air Quality Survey, there are three historic complaints that topped the list. These three complaints are:

1. Odors from wastewater lagoons;
2. Agricultural pollution; and
3. Dust from roads.

Odors from Wastewater Lagoons

There are ten (10) large wastewater collection lagoons on the Kickapoo Tribe in Kansas reservation, ranging in size from 1 – 4 cells. The total volume of each site ranges from 200,000 gallons at the least, up to 6 million gallons at the greatest. The primary purpose of these lagoons is the treatment of wastewater. As the water column changes temperature at certain times of the year, the ponds “turn-over” creating a rather foul smell for 1-3 weeks. This is a natural process and no simple solution can be applied to address the problem. Based on interviews with local tribal residents, no one can exactly pinpoint the date of the first smell complaint from the lagoons. At this time, there is no log of written complaints to the Kickapoo Environmental Office on the topic of lagoon odors.

When discussing the ponds with residents, there did appear to be some concern over whether the smell emanating from a pond would or could be hazardous to human health or the environment. Residents are generally told that other than smelling bad, there are no adverse health effects. While this may indeed be true, there has also not been any air monitoring to see if the levels of carbon dioxide, ammonia, hydrogen sulfide, or sulfur dioxide were above recommended limits for human exposure. The estimated cost of buying the equipment to test these parameters would be prohibitive at this point. There is a possibility of borrowing or leasing the equipment from USEPA, although the tribe would need a firm justification for sampling. Justification for sampling would need to be more pressing than a smell complaint.

In the past the tribe has looked into moving to a closed wastewater system or relocating the cells so that they are away from housing and businesses. Unfortunately, the cost of this solution would be in the area of $500,000 - $2,000,000 per site. There are companies that do sell odor controlling additives, but this option would also be very costly. The tribe has been using cedar trees planted around the lagoons to reduce odor, and this has provided a cost-effective method for minimizing odor.

Agricultural Pollution

Complaints related to agricultural activity on and near the reservation are generally focused on fugitive dust from tilling of farm land and harvesting of crops. Airborne dust is often visible during tilling and harvesting operations, and this naturally calls attention to potential problems. Most farmers already use accepted best management practices in order to conserve soil, but raising a dust cloud in dry weather or when harvesting soybeans is essentially unavoidable. Public education may be the only option in the case of agricultural-related dust.

A second agricultural concern is related to pesticide use. It is common to observe herbicide application to local crops by means of large spray rigs. An increasingly common practice in northeast Kansas is aerial application from “crop-duster” airplanes. This practice readily calls attention to the fact that vast quantities of pesticides are applied to crops, and concerns regarding exposure to overspray or drift are certainly legitimate. There may be nothing that can actually be done beyond ensuring that pesticide applicators are properly licensed and employ best management practices.

Dust from Roads

Another complaint is the issue of fugitive dust attributed to the multitude of unpaved and minimum maintenance roads on the reservation. The reservation itself covers 30 square miles, and it is crossed with a total of about 42 miles of unpaved roads, with the total of paved roads being about 22 miles. While traffic is not a huge issue on the unpaved roads, weather conditions of summer in northeast Kansas are often very hot, dry, and windy. These conditions exacerbate the issue. The fact that a majority of tribal facilities, including homes, are located less than 100 meters from an unpaved road leads to a significant exposure of the populace.

The USEPA recommendations on dealing with dust issues involve the following techniques:

1. Reducing potential wind speed through the use of windbreaks;
2. Application of water to road surfaces; and
3. Chemical stabilization.

Windbreaks provide an easy and cost-effective way to lower wind speeds. Use of windbreaks may provide some relief from windborne dust issues, but will not necessarily protect residents from dust kicked up by cars or farm equipment.

At first glance, it may seem that the most cost effective solution for road dust is the application of water, but this only offers a short-term solution. Watering of roads would actually be quite expensive. Costs would include purchasing a water truck and paying a driver. Water for watering roads might be taken from a public water supply, which seems a rather wasteful use for treated water. Finally, on hot, dry, dusty days, roads would dry rapidly, requiring repeated applications. For these reasons, watering of unpaved roads is not a viable option.

Certain chemicals which would provide a longer period of dust suppression can be used to treat exposed surfaces, but would have a higher cost for treatment than just using water. Choices for chemical road dust suppressants include magnesium chloride ($MgCl_2$), calcium chloride ($CaCl_2$), lignin (a by-product of paper manufacture), and various polymers. The judicious application of chemicals may, however, result in contamination of the treated dust, thereby incurring the risk of adverse effects on plant and animal life. Ironically, this in itself

could lead to additional respiratory complaints and higher actual health risks to the populace. Residents interviewed in person exhibited a very negative response to spraying chemicals near houses or places where children congregate.

An additional solution for reducing road dust is chip sealing (also called tar and chip paving) of selected unpaved roads. This provides a cost-effective paving method which has already been used on many roads in Brown County, and presents a more reliable long-term solution to the issue of fugitive road dust. Concomitant benefits of chip seal paving would include enhanced infrastructure and transportation safety.

The costs of various road treatments appear in the table below.

Relative Cost of Various Methods of Road Dust Suppression

Dust Suppression Treatment	Duration of Effectiveness	Estimated Cost *per* Mile of Road
Water	Very short (1 or 2 days)	Not considered as an option
$CaCl_2$ or $MgCl_2$ [a]	One season	$ 7,065
Incorporated lignin or polymer[a]	Up to one or two year(s)	$56,263
Double surface chip seal[b]	Up to six years	$20,533

[a] Leduc County, Alberta, Canada; dust suppression costs; http://www.leduc-county.com/operations/dust-suppression

[b] USEPA; Gravel Roads: Maintenance and Design Manual, App. D; http://water.epa.gov/polwaste/nps/gravelroads_index.cfm

Among the historical air quality complaints, fugitive dust from unpaved roads appears to be the most manageable. Chip sealing of selected roads offers a long-term and relatively cost-effective solution for mitigation of road dust. Although expensive, paving of roads would not only reduce public exposure to air pollution, but would also enhance infrastructure and transportation safety on the reservation.